paratus. The definitions of acids, bases, and salts are novel, but altogether bad. If they could be taken literally, they would include amongst the bases such diverse substances as oxygen, phosphorus, potassium permanganate, sugar, alcohol, camphor, benzene, toluene, formic acid, oxalic acid, since all these substances can "react with an acid, giving water as one of the products." Amongst the "salts" one would find chlorine, phosphoric acid, oxalic acid, ethyl acetate, ethylene, ether, camphoric acid, nitrobenzene, benzoic acid, carbon monoxide, and carbon dioxide, since each of these may appear in the guise of "substance, other than water, produced by the reaction of an acid and a base," as defined in the opening sentences of the chapter.

(5) Mr. Bausor's two books on chemical calculations may be commended on the ground that the problems bear a very close resemblance to those that would be met with in the actual experience of a chemical worker. No further commendation is needed except to say that the range of subjects and the working out of typical problems are alike satisfactory. The only improvement that may be suggested is to the effect that greater interest would be aroused and more useful information imparted incidentally if the author had drawn more freely on numerical data taken from classical experiments, such as those of Berzelius and of Stas, together with more modern experiments by Morley, Richards, Morse, Guye, and others.

(6) Dr. Knox's monograph on the fixation of nitrogen includes a great deal that has become very familiar in recent years, but the subject has been treated in a very satisfactory way. In addition to the well-known details of the Birkeland-Eyde process, ample space is devoted to the theory of the operations and to the many scientific experiments that have been made to elucidate them. The section on the ammonia equilibrium is particularly welcome, in view of the fact that this method of fixing nitrogen has been exploited in the technical Press to a much smaller extent than the processes described in the other two sections of the book. It is not usual to permit any detailed study of technical processes in an elementary course of chemistry, yet nothing but good would result if this little monograph were added to the curriculum of such a course; the problems with which it deals are so important and the underlying theories are so illuminating that they might well be used to add an element of romance and a new interest to the oft-told story of elementary inorganic chemistry.

T. M. L.

OUR BOOKSHELF.

Pattern-making. By F. W. Turner and D. G. Town. Pp. v+114. (New York: John Wiley and Sons, Inc.; London: Chapman and Hall, Ltd., 1914.) Price 4*s*. 6*d*. net.

THIS little book is intended for young pattern-makers, and presents a general survey of the most suitable materials, the special tools, and the fundamental processes of the trade, together with the relations of the pattern-shop with the allied departments, viz., the drawing office, the foundry, and the machine shop. The pattern-maker is principally concerned with the foundry, and throughout the book we find clear and concise descriptions of moulding processes, well-illustrated, together with discussions of the sometimes conflicting requirements of the moulder and pattern-maker, and explanations of the compromises which have to be adopted. In recent years the development of machine tools, both in the foundry and in the pattern-shop, has altered considerably the art of pattern-making and also the stock of hand-tools composing the private equipment of the artisan.

The book contains many interesting devices which have been developed by American workmen for special purposes, and in this respect will be found to be of considerable interest even to older pattern-makers in this country. A special word may be said regarding the illustrations in the book; these are excellent, both as regards the selection of typical examples and also clearness of drawing and reproduction.

We can confidently recommend the book to young pattern-makers and others connected with engineering, not that it will make them good pattern-makers—experience alone will produce this result—but on account of the broadening of views which is sure to be acquired during the perusal of its pages.

Foundations: a Short Text-book on Ordinary Foundations, including a brief description of the methods used for Difficult Foundations. By Prof. M. A. Howe. Pp. vii+110. (New York: John Wiley and Sons, Inc.; London: Chapman and Hall, Ltd., 1914.) Price 5*s*. 6*d*. net.

IN this book the author has treated in an elementary manner both the fundamental principles involved in the design of foundations and also standard methods of carrying out the actual work. Special treatment is given of the footing courses of structures, these being considered apart from the foundation proper. The Rankine theory is adopted for the permissible bearing pressure on soils, and a modified form of Rankine's formula is given; there is a brief discussion of the precautions which must be considered in dealing with various descriptions of soil. Several different methods of construction in the footing courses are given, such as concrete, brick, reinforced concrete, grillage, I beams, and cantilevers; these are clearly described, and the student will have no difficulty in following the methods of calculation. A feature of the book consists in worked-out examples of each case; these will be found to be of

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great service to the reader. The treatment of the design and driving of piles is good and up-to-date, as is also that of bridge piers and abutments.

The book possesses the merit of presenting a fairly complete exposition of a rather difficult subject without unnecessary profusion of detail, and will be welcomed by many students who desire more information regarding foundations than is to be found in the text-books dealing with the theory and design of structures generally.

LETTERS TO THE EDITOR.

[*The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts intended for this or any other part of* NATURE. *No notice is taken of anonymous communications.*]

The Camera in Australia.

Now that most members of the overseas party of the British Association have, happily, returned safely from the meeting in Australia, it seems opportune to remind members of the scheme for the exchange of photographic prints announced in the *Journal* (issued in Melbourne on August 12, 1914, p. 2), for which Dr. A. Holt and myself became responsible. The aim of the scheme was to economise our stock of plates and to prevent unnecessary duplicating of prints. Thus in the advance party in West Australia one member took a photograph of one striking object, a second member of another, on the understanding that all members of the party would be able to obtain, at their own expense, copies of the prints of the photographs, either by an exchange of photographic prints taken by themselves or by payment of the cost of the print supplied. It was an essential feature of the scheme that the photographers themselves should not suffer financial loss in meeting the requests of members for prints.

The scheme is sufficiently comprehensive to include not only illustrations of plants, animals, and scenery, but also of any features appealing to members specially interested in any one of the many Sections of the Association's activities. Thus timber felling, aboriginal camps and their life, manufacturing processes, as well as the lighter side of our visit, such as life on board ship and garden-parties, come within the scheme of exchange. In fact, if any member has photographs of interest taken either in Australia or on one of the many routes members followed to and from Australia it is hoped he will be willing to offer prints of the same to others. Though the scheme was intended in the first instance to apply to members of the overseas party and to local members of the Australian meeting, there is nothing to prevent it from developing so that members of the Association who were unable to attend the meeting may have the opportunity of obtaining a set of the photographic prints offered for exchange.

Will members willing to participate communicate with me as soon as possible? In each case a list of the prints available, together with the address of the supplier and the cost of the prints, should be given. It would be helpful if a set of the prints could also be sent for inspection and subsequent return.

From these lists a general list will be prepared and sent to each participator in the scheme. It will probably be an advantage to all concerned if the exchange is worked from one centre. This we shall be willing to undertake in the hope that all will co-operate by promptness of reply in making the task as light as possible.

It is hoped that the series of prints will serve not only as a permanent record of our unique and delightful experience, but also as illustrative material for teaching, lecture, and museum purposes. Thus members could at this moment help many deserving charities by giving lectures on Australia with these prints for illustration. T. JOHNSON.

Royal College of Science, Dublin.

Magnetic Disturbances, 1913.

DR. W. N. SHAW has asked me to send you an account of an examination, undertaken by his instructions, of the Eskdalemuir magnetograms for 1913. The examination indicates that the disturbances from the level of the quiet day inequality fall into two distinct classes A and B.

A.—The disturbance was due to a magnetic force which remained in a more or less fixed direction while changing sign in an oscillatory manner. Throughout the year the direction of this force had an azimuth lying within a range of about 60° on either side of the magnetic meridian and an inclination to the horizontal lying within the narrow limits 0° and 6°. The slope was upwards towards the more northerly end. An especially clear example occurred on March 23d., 14h. to 18h.

Pulsations of periods 2 to 15 minutes fall into this class. A search also brought to light longer periods of 19, 23, and 26 to 30 minutes. Beyond this there are measured periods of 180, 155, 148, 109, 100, 95, 85, 80, 80, 78, 74, 66, 60, 38 minutes, but the measurements have been uncertain to, say 15 per cent., and should perhaps be taken only to indicate the existence of actual periods near 79 minutes and between 150 and 180 minutes. The crowding together of the shorter periods of 2 to 15 minutes is suggestive of a harmonic series. The longest periods noted were recorded on the afternoons or evenings of June 17d., 21d., 23d., July 9d., 10d., 12d., 15d., 18d., 25d., August 7d., 9d., 11d., 28d. Class A appears to resemble the type of disturbance that Birkeland has attributed to a ring-shaped electric current encircling the earth at a great height above the ground in the plane of the magnetic equator. The periods noted above are enormously greater than the time (0·13 second) taken by an electromagnetic wave to travel round the earth. Similarly the wave-length of sodium light is enormously greater than the circumference of the sodium atom. Can there be a similarity of explanation in the two cases?

B.—The direction of the disturbing magnetic force was not fixed as in class A, but wandered about, usually remaining within 60° of a plane normal to the undisturbed force. The large, slow "bays" near midnight usually fell into this class. For example, the bays on October 7d., 0h. to 4h. Sometimes the disturbing force rotated as if it were rigidly attached to an axis nearly coinciding with the direction of the undisturbed force; the rotation was clockwise to an observer looking north and down. Class B appears to resemble the types of disturbance which Birkeland has called "polar" and "cyclo-median."

Class A disturbances sometimes occurred without class B, but class B seldom occurred without A.

Disturbances of the A class were identified by viewing the traces of the components laid over one another and pressed against a window-pane. The correspondence of the oscillations in the three components determined the matter.

Further particulars will be published in the British Meteorological and Magnetic Year Book, part iv. 2, 1913.

It will be interesting to know whether other observers have found corresponding phenomena in working up records for 1913. L. F. RICHARDSON.

The Observatory, Eskdalemuir, Langholm,
Dumfries-shire, December 11.

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